

REMARKS

Claims 1-57 currently stand rejected under 35 U.S.C. §103(a) as being unpatentable over Haga et al., U.S. Patent No. 5,541,900 (“Haga”) in view of Paul, U.S. Patent No. 6,198,417 B1 (“Paul”). This rejection is respectfully traversed and it is submitted that these claims recite subject matter which is patentable over Haga and Paul.

The Examiner is respectfully referred to the remarks contained in the previous responses (Amendments A, B, C and D) which are incorporated herein by reference, in addition to which the following remarks are respectfully submitted. Also, as before, for purposes of this discussion concerning “integrating circuit 10”, “amplitude modulation circuit 40” and “feedback circuit 30” of Haga, such elements of Haga may be discussed as though analogous to the presently recited “integration stage”, “modulation stage” and “first feedback stage”, respectively. However, any such discussion is merely to allow distinctions between the presently claimed subject matter and that disclosed by Haga to be more easily focused upon. No admissions are made or implied nor are any admissions to be inferred regarding any similarities, to the extent any may exist, between such elements or their respective functions.

Regarding independent claims 1, 20 and 39, the Examiner correctly notes that Haga does not teach “a modulation stage [which provides] a discrete time pulse width modulated signal” as presently recited. However, the Examiner then contends that Paul teaches providing discrete time pulse width modulation in conjunction with a “modulation stage” and an “integration stage”. In support of this, the Examiner cites column 1, lines 25-26, of Paul, apparently in reference to the discussion there regarding “discrete-time integrator 106” in Figure 1. As the motivation for combining the purported teachings of Haga and Paul, the Examiner states that “[i]t would have

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been obvious to one of ordinary skill in the art to implement the discrete time of Paul into Haga as to accurately analyze the modulator by modeling ideal quantization noise and other sources of non-ideal noise introduced by the ADC converter.” The source of the teaching or suggestion of such a motivation (to analyze a modulator by modeling noise?) is not cited. It is unclear whether it is a modulator of Haga or a modulator of Paul that would have been the intended beneficiary of such analysis based upon noise modeling.

Further, it is not seen how either of the Haga or Paul disclosures would be suggestive of a motivation related to analysis based upon noise modeling, either individually or in combination. While Haga is directed to a “pulse width modulation circuit” (as per its title), Paul is directed to a “pipelined oversampling A/D converter”(as per its title). Such elements are quite distinct from one another in terms of their respective functions. Haga contains no mention whatsoever of an A/D converter. Further, Paul contains no mention or suggestion whatsoever of a pulse width modulation circuit. Indeed, a word search of Paul reveals that nowhere in Paul does either of the words “pulse” or “width” appear. Moreover, the output signal of “analog modulator 102” of Paul (cited by the Examiner) is a “stream of digital bits” (Paul at col. 1, line 48), i.e., a series of fixed-width 1s and 0s. This is in contrast to the presently claimed invention in which the output pulses are of variable widths as would be expected of a pulse width modulation circuit.

Hence, it is respectfully submitted that it would not have been obvious to one of ordinary skill in the art to combine the subject matter of Paul with that of Haga and, therefore, independent claims 1, 20 and 39 are patentable over Haga and Paul.

Accordingly, it is further submitted that dependent claims 2-19, 21-38 and 40-57 are also patentable over Haga and Paul, particularly in view of the further limitations in these latter claims. For more specific remarks about these claims, as

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noted above, the Examiner is referred to the corresponding remarks contained in the previous responses (Amendments A, B, C and D) which are incorporated herein by reference.

Respectfully submitted,

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